

FORM PTO-1390
REV. 5-93US DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICEATTORNEYS DOCKET NUMBER
P00,0634**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/623296INTERNATIONAL APPLICATION NO.
PCT/DE99/00462INTERNATIONAL FILING DATE
19 February 1999PRIORITY DATE CLAIMED
05 March 1998TITLE OF INVENTION **Apparatus for Immediately Outputting the Response of a Synchronous System to an Asynchronous Event**

APPLICANT(S) FOR DO/EO/US

PETER SCHNEIDER ET AL

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2)) - drawings attached.
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)) - drawings attached.
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☒ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; (PTO 1449, 8 References, Search Report).
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.
(SEE ATTACHED ENVELOPE)
13. ☒ Amendment "A" prior to action.
 - ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☒ Change of Address of Applicants' Representative.
16. ☒ Other items or information:
 - a. ☒ Request for Approval of Drawing Changes, 1 sheet of drawings, Single Figure.
 - b. ☒ Appointment of Associate Power of Attorney.
 - c. ☒ EXPRESS MAIL # EJ077700928US dated September 1, 2000.

U.S. APPLICATION NO. IF PCT/PTO

097623296

INTERNATIONAL APPLICATION NO.
PCT/DE99/00462ATTORNEY'S DOCKET NUMBER
P00,063417. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO \$840.00

International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) ... \$670.00

No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but
international search fee paid to USPTO (37 C.F.R. 1.445(a)(2)) \$760.00Neither international preliminary examination fee (37 C.F.R. 1.482) nor international
search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO \$970.00International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all
claims satisfied provisions of 37 C.F.R. 1.492(f) \$56.00**ENTER APPROPRIATE BASIC FEE AMOUNT =** \$ 840.00Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months
from the earliest claimed priority date (37 C.F.R. 1.492(e)).

CALCULATIONS

PTO USE ONLY

Claims	Number Filed	Number Extra	Rate		
Total Claims	07 - 20 =	0	X \$ 18.00	\$	
Independent Claims	01 - 3 =	0	X \$ 78.00	\$	
Multiple Dependent Claims			\$260.00+	\$	
TOTAL OF ABOVE CALCULATIONS =				\$ 840.00	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)				\$	
SUBTOTAL =				\$ 840.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$ 840.00	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.29, 3.31). \$40.00 per property				+	
TOTAL FEES ENCLOSED =				\$ 840.00	
				Amount to be refunded	\$
				charged	\$

- a. ☒ A check in the amount of \$ 840.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 501519. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

SCHIFF HARDIN & WAITE
PATENT DEPARTMENT
6600 Sears Tower
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SIGNATURE

Mark Bergner
NAME

45,877
Registration Number

09/623296

534 Rec'd PCT/PTO 01 SEP 2000

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BOX PCT
IN THE UNITED STATES ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5

AMENDMENT "A" PRIOR TO ACTION

APPLICANT(S): PETER SCHNEIDER ET AL DOCKET NO: P00,0634

SERIAL NO:

GROUP ART UNIT:

EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/DE99/00462

10 INTERNATIONAL FILING DATE: 19 February 1999

INVENTION: APPARATUS FOR IMMEDIATELY OUTPUTTING THE
RESPONSE OF A SYNCHRONOUS SYSTEM TO AN
ASYNCHRONOUS EVENT

15 Assistant Commissioner for Patents,
Washington, D.C. 20231

Sir:

Applicants amend the above-identified PCT application as follows,
and request entry of the Amendment prior to examination in the United
States National Examination Phase.

20 **IN THE SPECIFICATION:**

At the top of each page, delete "GR 98 P 1296".

On page 1:

line 1, delete "Description";

line 5, insert:

25

--BACKGROUND OF THE INVENTION--;

line 6, delete "according";

delete line 7;

line 8, delete "is to say an apparatus";

line 14, delete ", "; after "and" insert --,--; and after "thus" insert --,

;

line 16, delete "itself" and "its"; and replace "the" with --a--;

5 line 17, replace "flank" with --edge of a clock signal--;

line 22, replace "which" with --that--;

line 23, delete "(may)";

line 24, replace "is" with --that--;

line 25, delete "when said events";

10 line 27, replace ", to be" with --(or--;

line 28, replace "precise" with --precisely--;

line 29, replace ", " with --)--;

line 31, replace "that" with --an--; and

line 32, replace "this" with --the--.

15 **On page 2:**

line 2, replace "flank" with --edge--;

line 8, replace "However, generally," with --Generally, however, --;

line 16, replace "allow this to be achieved when" with --achieve
immediate reaction to asynchronous event--;

20 line 17, replace "using" with --in--;

line 19, replace "have to" with --most--;

line 20, delete ", ";

line 22, replace "at the same time" with --simultaneously--;

line 26, replace "way" with --manner--;

25 line 29, replace "it" with --the system--;

after line 31, as a separate line before line 32, insert the following
heading: --SUMMARY OF THE INVENTION--;

line 32, replace "the" (second occurrence) with --an--;
line 33, replace "the" (first occurrence) with --an--; and replace
"according to the" with --that--;
delete line 34; and
5 line 35, replace "is possible to react" with --reacts--.

On page 3:

replace lines 1-9 with the following paragraph:

10 --This and other objects are achieved according to an aspect of
the present invention utilizing an advanced calculation device that
calculates the responses of the synchronous system to possible
asynchronous events in advance, and a switching device that selectively
passes on the output signal from the advanced calculation device or the
output signal from the synchronous system.--;

15 line 10, replace "In consequence," with --As a result,--;
line 11, replace "very" with --essentially--;
line 12, delete "largely";
line 18, replace "means that" with --affords--; and replace "can in
fact" with --the ability to--;

20 line 23, delete ", ";
line 24, replace "before said event occurs." with --of the event
occurrence.--;

replace lines 25-34 with the following paragraphs and headings:

25 --Additional advantages and novel features of the invention will
be set forth, in part, in the description that follows, and in part, will
become apparent to those skilled in the art upon examination of the
following or may be learned by practice of the invention. The advantages
of the invention may be realized and attained by means of the

instrumentalities and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

5 The single Figure shows, schematically, an apparatus according to an embodiment of the present invention for immediately outputting the response of a synchronous system to an asynchronous event.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS--;

line 36, replace "text" with --description--; and

line 37, replace "which" with --that--.

10 **On page 4:**

line 1, delete ", ";

line 2, delete ", ";

line 4, before "that" insert --such--;

line 12, replace "which" with --that--;

15 line 14, replace "flank" with --edge--;

line 18, replace "said flipflop: this" with --flipflop. This--;

line 22, replace "said" with --the--;

line 23, delete ", of course,";

line 27, replace "said" with --the--;

20 line 29, replace ", with the" with --. The--; and replace "being" with --is--;

line 31, delete ", ";

replace line 32, with --the switching device is designed to optionally and selectively pass on--;

25 line 35, delete ", optionally and selectively";

line 37, replace "where the" with --with a--; and

line 38, delete "is denoted by the".

SCANNED, # _____

On page 5:

line 1, delete "reference symbol"; and replace "device by" with --unit--;

line 2, delete "the reference symbol"; and delete "by the";

5 line 3, delete "reference symbol";

line 9, before "2" insert --unit--;

line 15, replace "; the" with --. A--;

line 17, after "signals" insert --E1, E2--;

line 18, after "is" insert --, --; and after "time" insert --,--;

10 line 19, replace "; if" with --. If--;

line 28, replace "device" with --unit--;

line 29, replace ", that is to say even" with --(i.e.,--;

line 30, replace "; if" with --). If--;

line 31, replace "can" with --may--;

15 line 32, delete ", "; and after "can" insert --,--;

line 33, after "time" insert --,--;

line 34, delete "if required";

line 35, delete "and"; and

line 37, replace "it" with --the switching device--.

On page 6:

line 3, replace "device" with --unit--;

line 4, replace "; the" with --. The--;

line 5, replace "which" with --that--;

line 7, replace "just" with --merely--;

25 line 9, after "time" delete ", ";

line 14, delete "in fact";

line 19, replace "device" with --unit 2--;
line 21, after "system" insert --1--; and replace "it" with --the
response--;

- 5 line 23, replace "said" with --the--;
 line 27, replace "device" with --unit--;
 line 32, delete " , ";
 line 33, delete " , ", and
 line 35, after "system" insert --1--.

On page 7:

- 10 line 1, after "early" insert --so--;
 line 3, delete " , ";
 line 4, delete " , "
 line 5, delete " , "; before "before" insert --(i.e.,--; and after "occur"
insert --)--;
- 15 line 8, delete " , ";
 replace line 9, with the following: --signals the event may, in this
case, also be used solely as a--;
- line 10, delete "means of"; and delete " , for example,";
- line 11, after "system" insert -- , for example--;
- 20 line 13, after "device" insert --3--; and delete "its";
 line 15, replace "The" with --It is noted that the above--;
 line 16, delete "being dependent on";
 line 17, replace " , any" with -- . Any--; and delete "(" , "
 line 18, delete ")";
- 25 line 21, after "The" insert --above--;
 line 22, delete "in the example described above"; and replace "it"
with --the apparatus--;

line 24, replace "; in" with --. In--; and
after line 29, insert the following:

--While this invention has been described in connection with what
is presently considered to be the most practical and preferred
embodiment, it is to be understood that the invention is not limited to the
disclosed embodiment, but, on the contrary, is intended to cover various
modifications and equivalent arrangements included within the spirit and
scope of the appended claims.--.

IN THE DRAWINGS:

The Applicants have filed concurrently herewith the Request for
Approval of Drawing Changes in order to add descriptions to the blocks
within the single Figure in order to conform with U.S. Patent practice.

IN THE CLAIMS:

On page 8, line 1, replace "Patent Claims" with --What is claimed
is:.

Please amend claims 1-7 as follows.

(Amended) An apparatus for immediately outputting the
response of a synchronous system [(1)] to an asynchronous event,
comprising:
[characterized by]
an advanced calculation [device (2) by means of which the] unit that
calculates responses of the synchronous system to possible
asynchronous events [can be calculated] in advance[.]; and [by] a
switching device [(3) by means of which the] that selectively passes on an
output signal from the advanced calculation device or [the] an output
signal from the synchronous system [can be passed on selectively].

2. (Amended) The apparatus as claimed in claim 1, wherein
[characterized in that]
the switching device [(3)] has at least two input connections [(E1, E2)],
one of [which is] the at least two input connections connected to [the] an
5 output connection of the synchronous system [(1)], and at least one of
[which] the at least two input connections is connected to the output
connection of the advanced calculation unit [device (2)].

3 (Amended) The apparatus as claimed in claim 2, wherein
[characterized in that]
10 the switching device [(3)] has a control connection [(C)], via which [it is
possible to define which of] the input signals [is] intended to be passed on
by the switching device are defined.

4. (Amended) The apparatus as claimed in [one of the preceding
claims] claim 1, wherein
15 [characterized in that]
[this] the apparatus is [designed] configured to output the output signal
from the advanced calculation unit [device (2)] in response to [the] an
occurrence of an asynchronous event.

5. (Amended) The apparatus as claimed in claim 1, wherein [of the
preceding claims characterized in that]
20 [this] the apparatus is [designed] configured to output the output signal
from the synchronous system [(1)] as soon as [this] the output signal from
the synchronous system represents [the] a response to [the] an event
[which] that was previously responded to by outputting the output signal
25 from the advanced calculation unit [device (2)].

6. (Amended) The apparatus as claimed in claim 1, wherein [one of the preceding claims, characterized in that] the synchronous system [(1)] is [designed] configured to output [the] a response to [the] an event requiring a response within a first period of time to provide [which had to be responded to, sufficiently early that] the advanced calculation device [(2) still has] a sufficient amount of time after the first period of time to predict [the] a response of the synchronous system to a next event before [it] the next event occurs.

7. (Amended) The apparatus as claimed in claim 1, wherein [one of the preceding claims, characterized in that] the advanced calculation device [(2)] is [designed] configured to complete advanced calculations [that need to be carried out], before the occurrence of [the] an event for which [the] a response of the synchronous system [(1)] needs to be calculated in advance.

15 **IN THE ABSTRACT**

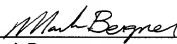
Delete original page 10 and replace the Abstract with Replacement Page 10 which we have provided on a separate sheet attached to the amendment.

REMARKS

The present amendment makes editorial changes to the specification, drawings, claims and Abstract in order to conform to United States Patent Practice. Additionally, the Applicants include herewith a copy of the new Abstract on a separate page. None of the changes in the claims is intended as a surrender of any of the subject matter within the scope of the original claim language since, as noted above, all of these changes have been made solely to bring the claims into conformity with the requirements of 35 U.S.C. §112, second paragraph.

Early consideration of the application is respectfully requested.

Respectfully submitted,



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1/PRTS

09/623296

Description

534 Rec'd PCT/PTC 01 SEP 2000

Apparatus for immediately outputting the response of a synchronous system to an asynchronous event

The present invention relates to an apparatus according to the precharacterizing clause of patent claim 1, that is to say an apparatus for immediately outputting the response of a synchronous system to an asynchronous event.

A synchronous system is a system whose state changes only at specific (normally equidistant) times. Such a system is, for example, a digital circuit in which the sequential elements (the flipflops), and thus the circuit containing the sequential elements as well, itself changes its state only during the rising or falling flank, or shortly after it (delayed by the gate delay times). The times at which state changes can occur are referred to in the following text as defined state changing times.

In contrast to this, an asynchronous event is an event which may occur at any time.

Since synchronous systems (may) react on certain occasions with a defined result to events is when said events occur more or less precisely at the defined state changing times, it has been found to be advantageous for the asynchronous events, to be more precise the signals or signal changes which signal such events, to be synchronized (phased-in). This can be done, for example, by connecting a flipflop downstream from that input connection via which the asynchronous event is fed into the system, with the input of this flipflop and the asynchronous input connection of the synchronous system being connected to one another. Since signals applied to the flipflop input

are transferred to the flipflop output only on the rising or falling flank of a clock signal, a synchronous (phase-in) signal is available at the flipflop output.

- 5 This makes it possible to ensure that the synchronous system always reacts correctly to asynchronous events.

However, generally, the synchronous system does not respond immediately to an asynchronous event, but
10 with a greater or lesser delay, since synchronous systems can in fact change their state only at the defined state changing times.

However, in certain cases, it is necessary to react to the occurrence of an asynchronous event
15 immediately.

In order to allow this to be achieved when using a synchronous system, it is possible for those parts of the system to which asynchronous events are input and which have to produce a response to these
20 events, to be operated asynchronously. The relevant system parts can be operated asynchronously, for example, by at the same time using the asynchronous event as the clock signal for these system parts, as a result of which the elements in the relevant system
25 parts switch at the same time that asynchronous events occur. In this way, it is possible to respond to asynchronous events immediately. However, a problem in this case is that the synchronously operating part of the system and the asynchronous part of it change their
30 states at different times and must be synchronized with one another in a complex manner.

The present invention is thus based on the object of developing the apparatus according to the precharacterizing clause of patent claim 1 such that it
35 is possible to react immediately to asynchronous events in a simple manner.

This object is achieved according to the invention by the features claimed in the characterizing part of patent claim 1, that is to say by an advanced calculation device by means of which the responses of
5 the synchronous system to possible asynchronous events can be calculated in advance, and by a switching device by means of which the output signal from the advanced calculation device or the output signal from the synchronous system can be passed on selectively.

10 In consequence, it is possible to continue operating the synchronous system "normally" and very largely without any change. The fact that the system's response to asynchronous events takes place only after a greater or lesser delay after the occurrence of the
15 asynchronous events is not disadvantageous since the capability to output a response calculated in advance by the advanced calculation device in the meantime means that the synchronous system can in fact react immediately and independently to asynchronous events.
20 The currently determined response of the synchronous system need be only sufficiently early for the advanced calculation device to have sufficient time to calculate the response to the next asynchronous event in advance, before said event occurs.

25 Advantageous developments of the invention can be found in the dependent claims, the following description and the figure.

The invention will be described in more detail in the following text using an exemplary embodiment,
30 and with reference to the figure.

The figure shows, schematically, the configuration of an exemplary embodiment of an apparatus for immediately outputting the response of a synchronous system to an asynchronous event.

35 The apparatus described in more detail in the following text contains a "normal" synchronous system, that is to say a system which reacts synchronously to asynchronous events.

The asynchronous events, or the signals which signal them, are preferably synchronized or phased-in before being used by the synchronous system. To this end, the relevant event is delayed sufficiently that it appears to the synchronous system as if the event had occurred at a defined state changing time. In the present case, this is achieved by connecting a flipflop downstream from the input connection via which the asynchronous event is input into the system, with the input of this flipflop and the asynchronous input connection of the synchronous system being connected to one another. Since signals which are applied to the flipflop input are transferred to the flipflop output only with the rising or falling flank of a clock signal, a synchronous (phased-in) signal is available at the flipflop output. As a rule, it has been found to be advantageous for at least one further flipflop to be connected downstream from the said flipflop; this allows the occurrence of metastable states to be prevented.

In cases in which the synchronous system reacts correctly to the asynchronous events even without said events being synchronized, it is, of course, possible to dispense with the synchronization of the asynchronous events.

In order to allow the system to react immediately to asynchronous events, said system also has an advanced calculation device and a switching device, with the advanced calculation device being designed to calculate the responses of the synchronous system to possible asynchronous events in advance, and with the switching device being designed to pass on either the output signal from the advanced calculation device or the output signal from the synchronous system, optionally and selectively.

The fundamental configuration of such an arrangement is shown in the figure, where the synchronous system is denoted by the

reference symbol 1, the advanced calculation device by the reference symbol 2, and the switching device by the reference symbol 3.

5 The switching device 3 may be, for example, a multiplexer and, in the example under consideration, has input connections E1 and E2, an output connection A and a control connection C, with the first input connection E1 being connected to the output connection of the advanced calculation 2, and with the second
10 input connection E2 being connected to the output connection of the synchronous system 1. The signal which is output at the output connection A of the switching device 3 is either the signal applied to its input connection E1 or the signal applied to its other
15 input connection E2; the control signal applied to the control connection C determines which of the input signals is passed on. The output signal A from the switching device 3 is at the same time the output signal from the entire apparatus; if the signal (not
20 shown in the figure) which is input into the apparatus is a signal signaling an asynchronous event, the output signal A from the switching device 3 represents the response of the synchronous system 1 to the asynchronous event.

25 The synchronous system 1 is the synchronous system which has already been described above.

As has already been stated above, the advanced calculation device 2 is designed to determine the response to an event in advance, that is to say even
30 before the event occurs; if more than one event can occur, the responses can be determined for all the events or a selected number of events, and can at the same time be applied to a plurality of input connections of the switching device 3 or, if required
35 and alternatively, can be applied to the switching device 3 via one or a relatively small number of input connections to it.

When an asynchronous event occurs, it is now possible for the response, calculated in advance by the advanced calculation device 2, to be output immediately; the response (which is preferably permanently applied via a flipflop or the like) which is produced at this stage at one of the input connections of the switching device 3 just has to be passed on by the switching device 3 to its output connection A, which can be done without any problem, at any time, and with immediate effect, via its control connection C.

In the given circumstances, there is no reason for the synchronous system 1 to react asynchronously to the asynchronous event. Finally, the response to the asynchronous event is in fact output precisely at the time that it occurs. Nevertheless, the synchronous system also reacts to the asynchronous event and, in doing so, comes to the same conclusion as the advanced calculation carried out by the advanced calculation device.

As soon as the response of the synchronous system occurs, it is applied to the input connection E2 of the switching device 3 and causes, via the control connection C, said switching device 3 to pass this signal straight on to the input connection A.

Since the response of the synchronous system 1 to the asynchronous event and the response determined in advance by the advanced calculation device 2 are the same (they just originate from different sources), nothing changes at the output connection A of the switching device 3. However, in this way, the advanced calculation device can start to calculate the response to the next asynchronous event, or the responses to the various next asynchronous events, in advance.

Although it is unnecessary for the synchronous system to react immediately to the asynchronous event, it must not take an indefinite time to do so. The process of finding the response must

- be completed sufficiently early that the advanced calculation device still has sufficient time to calculate the response to the next asynchronous event, or the responses to various asynchronous events, in advance, before they occur.

Obviously, the apparatus described above can be used for widely differing purposes.

- The asynchronous event, or the signal which signals it, may in this case also be used "just" as a clock by means of which, for example, data are output asynchronously from a synchronous system. In this case, it is sufficient for the asynchronous event to be used to actuate the switching device (to actuate its control connection C).

- The described arrangement is not limited to being dependent on operating on only one asynchronous input signal; any desired number of (synchronous and/or asynchronous) input signals may be taken into account. In this case, it is irrelevant whether the asynchronous input signals are in synchronism with one another.

- The described apparatus is an electrical system in the example described above. However, it could also be an electromechanical or mechanical system. The above statements apply as appropriate to such systems; in this case, however, the terms "input and output signals" may mean mechanical states.

The described apparatus makes it possible for responses by synchronous systems to asynchronous events to be output immediately after said events occur.

Patent Claims

1. An apparatus for immediately outputting the response of a synchronous system (1) to an asynchronous event,
5 characterized by
an advanced calculation device (2) by means of which the responses of the synchronous system to possible asynchronous events can be calculated in advance, and
10 by a switching device (3) by means of which the output signal from the advanced calculation device or the output signal from the synchronous system can be passed on selectively.
2. The apparatus as claimed in claim 1,
15 characterized in that
the switching device (3) has at least two input connections (E1, E2), one of which is connected to the output connection of the synchronous system (1), and at least one of which is connected to the output
20 connection of the advanced calculation device (2).
3. The apparatus as claimed in claim 2,
characterized in that
the switching device (3) has a control connection (C),
25 via which it is possible to define which of the input signals is intended to be passed on.
4. The apparatus as claimed in one of the preceding claims,
characterized in that
this apparatus is designed to output the output signal
30 from the advanced calculation device (2) in response to the occurrence of an asynchronous event.
5. The apparatus as claimed in one of the preceding claims,
characterized in that
35 this apparatus is designed to output the output signal from the synchronous system (1) as soon as this signal represents the response to the event which was responded to by outputting the

output signal from the advanced calculation device (2).

6. The apparatus as claimed in one of the preceding claims, characterized in that

- 5 the synchronous system (1) is designed to output the response to the event which had to be responded to, sufficiently early that the advanced calculation device (2) still has sufficient time to predict the response of the synchronous system to a next event before it occurs.
- 10

7. The apparatus as claimed in one of the preceding claims, characterized in that

- the advanced calculation device (2) is designed to
- 15 complete advanced calculations that need to be carried out, before the occurrence of the event for which the response of the synchronous system (1) needs to be calculated in advance.

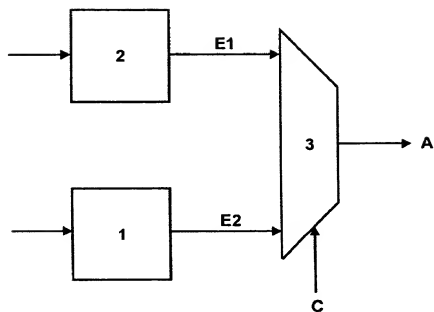
Abstract

Apparatus for immediately outputting the response of a synchronous system to an asynchronous event

The described apparatus is distinguished by an advanced calculation device by means of which the responses of the synchronous system to possible asynchronous events can be calculated in advance, and by a switching device by means of which the output signal from the advanced calculation device or the output signal from the synchronous system can be passed on selectively. It is thus possible to output responses from synchronous systems to asynchronous events immediately after such events occur.

ABSTRACT

An apparatus for immediately outputting a response of a synchronous system to an asynchronous event includes an advanced calculation device by means of which the responses of the synchronous system to possible asynchronous events can be calculated in advance. Also, a switching device is included by means of which the output signal from the advanced calculation device or the output signal from the synchronous system can be passed on selectively. It is thus possible to output responses from synchronous systems to asynchronous events immediately after such events occur.



Writs

BOX PCT
IN THE UNITED STATES ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5 APPLICANT(S): PETER SCHNEIDER ET AL DOCKET NO: P00,0634
SERIAL NO: GROUP ART UNIT:
EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/DE99/00462

INTERNATIONAL FILING DATE: 19 February 1999

10 INVENTION: APPARATUS FOR IMMEDIATELY OUTPUTTING THE
RESPONSE OF A SYNCHRONOUS SYSTEM TO AN
ASYNCHRONOUS EVENT

Assistant Commissioner for Patents,
Washington, D.C. 20231

15 **REQUEST FOR APPROVAL OF DRAWING CHANGES**

The Applicants respectfully request consideration and approval of
changes made to the single Figure, marked in red and included herewith.
Descriptions have been added to the blocks shown in the Figure in order
to comply with U.S. Patent Practice.

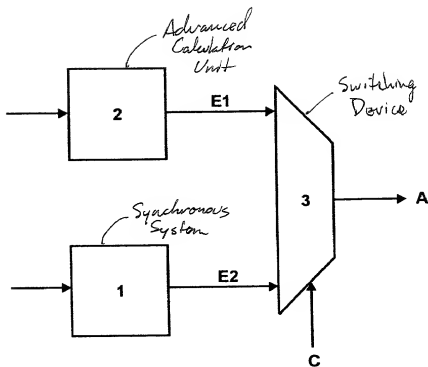
20 Respectfully submitted,

Mark Bergner (Reg. No. 45,877)

Mark Bergner
SCHIFF HARDIN & WAITE
PATENT DEPARTMENT
6600 Sears Tower
Chicago, Illinois 60606-6473
(312) 258-5779
Attorneys for Applicant

25

1/1



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S): PETER SCHNEIDER ET AL

DOCKET NO: P00,0634

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ASYNCHRONOUS EVENT

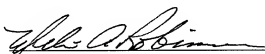
Assistant Commissioner for Patents,
Washington, D.C. 20231

APPOINTMENT OF ASSOCIATE POWER OF ATTORNEY

Sir:

I am an attorney designated on the Power of Attorney for the above-referenced application. I hereby appoint Mark Bergner (Reg. No. 45,877) as an associate attorney, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Submitted by,

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Attorney for Applicant(s)

Date: September 1, 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S): PETER SCHNEIDER ET AL

DOCKET NO: P00,0634

SERIAL NO:

GROUP ART UNIT:

EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/DE99/00462

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Assistant Commissioner for Patents,
Washington, D.C. 20231

APPOINTMENT OF ASSOCIATE POWER OF ATTORNEY

Sir:

I am an attorney designated on the Power of Attorney for the above-referenced application. I hereby appoint Mark Bergner (Reg. No. 45,877) as an associate attorney, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Submitted by,

 (Reg. No. 31,870)
Melvin A. Robinson
SCHIFF HARDIN & WAITE
PATENT DEPARTMENT
6600 Sears Tower
Chicago, Illinois 60606-6473
(312) 258-5785
Attorney for Applicant(s)

Date: September 1, 2000

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION
ERKLÄRUNG FÜR PATENTANMELDUNGEN MIT VOLLMACHT
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit
an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine
Staatsangehörigkeit den im Nachstehenden nach
meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste
und alleinige Erfinder (falls nachstehend nur ein Name
angegeben ist) oder ein ursprünglicher, erster und
Miterfinder (falls nachstehend mehrere Namen
aufgeführt sind) des Gegenstandes bin, für des dieser
Antrag gestellt wird und für den ein Patent beantragt
wird für die Erfindung mit dem Titel:

**Vorrichtung zur Ausgabe der Antwort Eines
Synchronen Systems Auf Ein Asynchronisches
Ereignis**

deren Beschreibung

(zutreffendes ankreuzen)

☐ hier beigefügt ist.

☐ am _____ als

☐ PCT internationale Anmeldung

☐ PCT Anmeldungsnummer _____

☐ eingereicht wurde und am _____

☐ abgeändert wurde.

Ich bestätige hiermit, dass ich den Inhalt der obigen
Patentanmeldung einschliesslich der Ansprüche
durchgesehen und verstanden habe, die eventuell
durch einen Zusatzantrag wie oben erwähnt abgeändert
wurde.

Ich erkenne meine Pflicht zur Offenbarung
irgendwelcher Informationen, die für die Prüfung der
vorliegenden Anmeldung in Einklang mit Absatz 37,
Bundesgesetzbuch, Paragraph 1.56 von Wichtigkeit
sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile
gemäss Abschnitt 35 der Zivilprozessordnung der
Vereinigten Staaten, Paragraph 119 aller unten
angegebenen Auslandsanmeldungen für ein Patent
oder eine Erfindersurkunde, und habe auch alle
Auslandsanmeldungen für ein Patent oder eine
Erfindersurkunde nachstehend gekennzeichnet, die ein
Anmeldedatum haben, das vor dem Anmeldedatum der
Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are
as stated below next to my name,

I believe I am the original, first and sole inventor (if only
one name is listed below) or an original, first and joint
inventor (if plural names are listed below) of the subject
matter which is claimed and for which a patent is
sought on the invention entitled

the specification of which

(check one)

☐ is attached hereto

☐ was filed on _____ as

PCT international application

PCT Application No. _____

and was amended on _____

I hereby state that I have reviewed and understand the
contents of the above identified specification, including the
claims as amended by any amendment referred to
above.

I acknowledge the duty to disclose information which is
material to the examination of this application in
accordance with Title 37, Code of Federal Regulations,
§1.56.

I hereby claim foreign priority benefits under Title 35,
United States Code, §119 of any foreign application(s)
for patent or inventor's certificate listed below and have
also identified below any foreign application for patent
or inventor's certificate having a filing date before that
of the application on which priority is claimed:

German Language Declaration

Prior foreign applications
Priorität beansprucht

198 094 39.6 **Germany**
(Number) (Country)
(Nummer) (Land)

05 März 1998
(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

(Number) (Country)
(Nummer) (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

(Number) (Country)
(Nummer) (Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

Priority Claimed

☒ ☐
Yes No
Ja Nein

☐ ☐
Yes No
Ja Nein

☐ ☐
Yes No
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56 meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122 I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig,
aufgegeben)

(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig,
aufgegeben)

(Status)
(patented, pending,
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

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German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: (Name und Registrationsnummer anführen)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

And I hereby appoint Messrs. John D. Simpson (Registration No. 19,842), Dennis A. Gross (24,410), Robert M. Barrett (30,142), Steven H. Noll (28,982), Kevin W. Guynn (29,927), Robert M. Ward (26,517), Brett A. Valiquet (27,841), Edward A. Lehman (22,312), David R. Metzger (32,919), Todd S. Parkhurst (26,494), James D. Hobart (24,149), Melvin A. Robinson (31,870), Joseph P. Reagan (35,332), Michael R. Hull (35,902), Michael S. Leonard (37,557), William E. Vaughan (39,056) and Lewis T. Steadman (17,074), all members of the firm of Hill & Simpson, A Professional Corporation

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312/876-0200

Ext. 3491

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Send Correspondence to:

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Staatsangehörigkeit Bundesrepublik Deutschland	Citizenship
Postanschrift Enhuberstr. 12	Post Office Address
80333 Muenchen Bundesrepublik Deutschland	

Voller Name des zweiten Miterfinders (falls zutreffend): STEINECKE, Thomas	Full name of second joint inventor, if any:
Unterschrift des Erfinders <i>Thomas Steinecke</i> Datum 29.05.00	Inventor's signature Date
Wohnsitz 85457 Hofsingelding, Germany DEX	Residence
Staatsangehörigkeit Bundesrepublik Deutschland	Citizenship
Postanschrift Am Hof 14	Post Office Address
85457 Hofsingelding Bundesrepublik Deutschland	

(Bitte entsprechende Informationen und Unterschriften im Falle von weiteren Miterfindern angeben).

(Supply similar information and signature for subsequent joint inventors).